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The Surroundings of Statues and Monuments.

WE have often said that in this country the placing of outdoor statues and monuments is not properly considered. Such works cannot have their most effective exposure nor can they increase the attractiveness of their surroundings, unless they are artistically adapted to the special character and the special arrangement of neighboring objects. The effect of its environment upon the work of art, and the effect of the work upon its environment should be considered with equal care. And this care can be rightly bestowed only if the site is selected before the monument is designed. At the very least, the general character of the probable site should be thoroughly well understood in advance.

The folly of disregarding these plain truths has recently been shown by the attempt to secure a monumental statue of General Sherman for the city of Washington. Exceptionally fine sites for monuments of all kinds exist in that city; and from all accounts the models recently put on exhibition are interesting and varied in character. Yet the first thought excited in the minds of all who have examined these models seems to have been the difficulty of deciding between them, for the reason that no one had any idea where the accepted design would eventually be placed.

One of the newspapers of the city remarked that with this thought, as it inevitably arose, came "a feeling of injustice, not to the artists personally, for they all share alike in the disadvantage, but to their art itself, in asking for competitive designs without any indication of the kind of location the proposed monument is to occupy. It will readily be seen how a design of superior excellence in itself may fail of success because not so well suited to certain finally chosen surroundings as another of less merit; also that every artist was placed in a trying dilemma, whether to try to adapt his work in a blind sort of way to all possible surroundings at the sacrifice of artistic completeness and strength, or to design with a view to an imagined combined effect of statue and environment at the risk of being thrown out for want of these conditions."

Some of the competitive designs were elaborate constructions with terraces, balustrades or parapet-walls. Others showed the chief equestrian figure upon a highly wrought pedestal adorned by subordinate figures or groups; and others presented this figure in isolation upon a simple pedestal. The mere fact that, among the designs of the last-named class, the pedestals varied conspicuously in height, complicated judgment upon the intrinsic merits of the works by bringing in the question of appropriate placing. And, of course, the more elaborate the compositions were, and the more dominant their architectural elements, the greater became the importance of the matter of placing and environment.

Four of these varied compositions were eventually selected from the many. But just here an evil only too common in American practice once more has obtruded itself; that is, the decision of the distinguished sculptors who had been selected as experts to pronounce upon the merits of the models was not fully accepted by the representatives of the Army of the Tennessee, the donors of the statue. Only one of the four models which has received the honor of published preference, and the author of which has been admitted to the final competitions, was among the four which the expert jury pronounced the best. After such a bad beginning, the Committee of the Army of the Tennessee has now to decide upon the site it prefers, and to obtain official permission to use it. It is stated that this choice will be made before the four prize-takers begin to elaborate their ideas for the final competition. But it is already too late to utilize the fine artistic opportunity to the full. The committee must be confused in its selection of a site by the varying character of the four models for which it has shown its preference; and when the site is chosen more than one of the competitors will be forced to alter his idea conspicuously, or, perhaps, to recast it into a composition of an entirely different kind. This fact is made plain when we say that one of the chosen designs shows a very tall pedestal, surmounted by an equestrian statue, adorned with large reliefs and surrounded by allegorical figures, all raised upon an elaborate architectural base, while another shows a much lower pedestal with an exedra behind it; that is to say, one of these two monuments should be equally conspicuous from all points of view, while the other should be so set that the front view would be much more important than any other.

The proper method of procedure in a case like this would have been to choose a site at the very outset, after consulting with the experts who were to judge the models in regard to the general character which would be desirable for the monument itself. Thus, an intelligent choice among varying sites could have been made, and, on the other hand, the artist would have had a definite, or, at least, general idea to work upon. Or, still better, in a city where monumental sites are so fine and so diverse as they are in Washington, two or three sites of different sorts might have been chosen, with the understanding that it was open to each competitor to decide for which one he would prepare his design, and that his design would then be judged upon its intrinsic merits, as adapted to that special situation and no other. Thus the danger of possible loss through the checking of some fine idea by too narrow a limitation of opportunity would have been avoided, and yet the sculptors would not have been obliged to adapt their work "in a blind sort of way to all possible surroundings at the sacrifice of artistic completeness and strength," or else "to design with a view to an imagined combined effect of statue and environment" which it might prove impossible to realize in fact.

When it comes to a decision between the merits of works offered in competition, as little as possible should lie in the scale besides the intrinsic excellence of the respective models. And this state of things can be brought about only if the competitors have in advance a clear idea with regard to the special site, or, at least, the special kind of site for which their work is desired.

Rate of Growth of the Long-leaf Pine.

THE rate of growth of the Long-leaf Pine, Pinus palustris, given in the accompanying table, is based upon the measurements of sixty-five trees from various stations within its range. The measurements of the individual trees were extended enough to enable the Division of Forestry, with a sufficient number of properly selected trees, say, from 400 to 500 of a species, to make a complete investigation regarding its growth and progessive development. But while the biological laws of this species cannot be determined until a greater number of trees is examined, the rate of growth may be more or less clearly demonstrated by the analysis of the individuals already measured.

Height Growth.—The growth in height of Long-leaf Pine is comparatively slow for the first four or five years (about three or four inches); for the next two or three years the height growth has not been fully investigated, though it is also said to be slow. The most rapid stage of height growth begins with the seventh or eighth year, and continues to the 30th or 35th year, and amounts to from 16 to 17 inches annually. A tree 30 or 35 years old is from 37 to 44 feet high. From the 30th to the 50th year the annual growth in height begins to lessen, and is not more than 12 inches. A tree 50 years old is from 56 to 60 feet high. From the 50th to the 80th year the height growth rapidly decreases to about six inches annually, and grows less and less up to the age of from 90 to 100 years, when the tree reaches its full height growth—that is, from 76 to 80 feet. That Long-leaf Pine actually reaches about its full height in from 90 to 100 years is easily learned from the measurements of old trees which in from 225 to 300 years reach a total height not exceeding 108 to 118 feet.

Diameter Growth.—The diameter accretion of Long-leaf Pine is rapid for the first 30 years, when its trunk thickens by 1.6 inches (bark excluded) for each decade. For the next 50 years there is noticed a slight decrease in the diameter accretion, and for each decade only 1.4 inch is produced. A tree 80 years old at breast-height is 13 inches in diameter, including bark; this decrease of diameter accretion continues with age, being 1.2 inches for each decade between 80 and 100 years, 0.9 of an inch between 100 and 120, and 0.8 of an inch between 120 and 140 years. From the 140th year the diameter accretion falls very rapidly, its increase not exceeding 0.3 to 0.4 of an inch for each of the successive decades.

While the diameter accretion decreases with age—that is, while the rings become narrower from the centre of the tree to its periphery—the areas formed by them on the cross-sections, excluding the 20 central rings, are almost equal for the third, fourth, fifth and sixth decades. With the seventh decade, though, there is an increase of the areas, compared with those of the previous years; that increase is almost the same for the successive decades up to 140 years inclusive. Thus, dividing the time of the diameter growth into two periods, the areas of every 10 rings on the cross-section are almost equal within the limits of each period. It will be readily understood that each ring must be thinner with the increase of diameter.

Mass Accretion.—Speaking of mass accretion, it will be more convenient to consider separately the annual increase of the volume of a tree and that for certain periods. We distinguish two kinds of annual accretion: one, an average annual increase of the mass, produced for the total age of tree, which can be easily obtained by dividing the volume of the tree by its age. The other, called current accretion, is simply the increase of volume of a tree for a given year of its age.

From the table given below it will be seen that both current and average annual accretions, being scarcely perceptible for the first years, become gradually larger and larger till they reach their maximum point, and, remaining at those points for a couple of years, begin to decrease first gradually and slowly, then rapidly. It will be seen, also, that while the current accretion, passing its culmination point, becomes smaller and smaller, the average annual accretion still increases, approaching the maximum and becomes almost equal to the current accretion when the tree is between 160 and 170 years of age. The age of a tree, when its average annual accretion becomes equal to the current accretion, is equal to that of the maximum point of the average annual accretion. The same is true with regard to all species.* The difference will be only in the age at which different species reach the stage of maximum growth. It depends a great deal upon the conditions under which the species is growing—that is, soil, moisture, climatic and forestry conditions. Thus the correlation between the current and average annual accretion is of great economical value, for it determines the time when a species reaches the stage of its maximum growth. The rotation for Long-leaf Pine, should it depend on the stage of maximum growth, would lie between 160 and 170 years.

RATE OF GROWTH OF THE LONG-LEAF PINE.
(Published in advance by permission of the Division of Forestry.)

Age.	Diameter with bark (breast-high).	Length of timber with upper diameter of five inches.	Height of tree.	Volume.		Periodical accretion.					Average annual accretion.	Current accretion.
				Tree.	Log.	Decade.	Diameter.	Height.	Area of cross-section.	Volume.		
	Ins.	Feet.	Feet.	Cubic feet.	Cubic feet.		Ins.	Feet	Sq're feet.	Cubic feet.	Cub. feet.	Cub. feet.
10	2.1		9	0.12		1st	1.4	9	0.01	0.12	0.01	0.01
20	3.8		23	1 20		2d	1.8	14	0 04	1.08	0.06	0.11
30	5 5		37	3.35		3d	1.6	14	0.07	2.15	0.11	0.21
40	7.0	16	48	7.06	5.61	4th	1.2	11	0.08	3.71	0.18	0.37
50	8.1	24	56	10.75	9.30	5th	1.2	8	0.08	3.69	0.21	0.37
60	9.6	34	62	15.26	13.99	6th	1.4	6	0.12	4 51	0.25	0.45
70	11.5	44	67	24.16	23.11	7th	1.6	5	0.17	8.90	0 35	0.89
80	13.0	52	72	33.18	32 27	8th	1.6	5	0.19	9.02	0 41	0.90
90	14.5	56	76	43.57	42 66	9th	1.2	4	0.16	10 39	0.48	1.04
100	16.0	60	80	55.85	54.94	10th	1.2	4	0.17	12.28	0.56	1.23
120	18.0	65	87	76.87	75.87	11th 12th	1.8	7	0.30	21.02	0.64	1.05
140	19.5	72	93	96.44	95.49	13th 14th	1.6	6	0 29	19.62	0.69	0.98
160	20.5	80	98	112.3	111.5	15th 16th	0.8	5	0.16	15.86	0.70	0.79
180	21.3	85	103	122.0	121.2	17th 18th	0.7	5	0.12	10.7	0.67	0.53

But in fixing the rotation there ought to be taken into consideration the so-called stage of maximum value—that is, the stage when a cubic foot in the tree has its greatest value. For instance, one cubic foot in a tree 160 years old is worth $0.05; the same cubic foot in the same tree when it is 180 years old will be worth $0.07. With age the tree increases not only its mass, but also the value of the mass laid up previously, because the boards made from the oldest tree, being of a larger size, will bring a larger price. For Long-leaf Pine under the conditions of its present growth a rotation of 200 years is suggested as being the most economical that can be adopted.

In the table is shown the increase of volume for every ten years; we call it periodical accretion. A close examination of the figures given will give an idea as to the rate of volume growth of Long-leaf Pine.

Quite different would be the case under forestry management. In our records of tree measurements there are two whose environments in the forest are the same as those that would take place under management. Tree No. 314 (see table below), fifty-three years old, is from a moderately dense forest, the crowns of the trees being equally closed from all sides, thus forming a favorable roof-cover for that age. A Long-leaf Pine up to 90 to 100 years—that is, when it has reached its full height—being surrounded by neighbors of the same age—is competing with them for

* A mathematical proof of this law is given by Eger in *Allg. Forst und Jagdzeitung* for 1842, p. 175. Another, by means of calculus, is found there for 1870, p. 482.

light, and thus striving to increase its height growth, to be the first in stretching out its crown and to be the first in attaining the end of its biological destination to bear seeds. The trees are increasing their height vigorously, the trunks are regular in shape, clear of limbs, straight, and their diameter is not decreased so rapidly in proportion to the height. The forester will maintain the full cover in order to get all the advantages of the serviceable struggle among the individuals until they reach their full height. Then he should break the roof cover to give perfect freedom to the crowns, and to get all the light possible, which will increase the width of the annual ring, and thus the volume of tree. Tree No. 309, 140 years old, and tree No. 19, 149 years old, have perfectly free crowns and stand, as the record states, in the open forest. That would be exactly the condition under which they would be placed in a properly managed forest.

The following are the measurements of these trees:

No	Age.	Diam.	Height.		Volume.		Accretion.	
			Tree.	Log.	Tree.	Log.	Average Annual.	Current.
314	53	12.5	60	35	19.96	17.84	0.37	0.42
309	149	25.5	102	86	142.18	141.13	0.99	2 40
19	160	25.5	111	83	176.96	170.23	1 11	2.12

Comparing these figures with those given in the table it will be seen that while Long-leaf Pine, under its present conditions, is not of much value when it is fifty years old, producing only four cubic feet in a log twenty-four feet long and eight inches in diameter; the same Pine, properly situated, would produce four times as much in a log thirty-five feet long with twelve and one-half inches in diameter. Not only would it grow well, giving an average annual accretion of 0.37, instead of 0.21 cubic feet, but it also promises to be thrifty in the future, for the current accretion is 0 42 instead of 0.37. The difference in the rate of growth will be more appreciated when compared at the age of 140 to 160 years. While a tree in a dense forest forms a log of 67 to 82 cubic feet, in the open forest the tree produces 148 to 177 cubic feet in a log of a larger size; while the 140-year-old tree, with deficiency of light, increases its volume for the next twenty years 16 cubic feet; the same tree with plenty of light in eleven years gives an increase of 36 to 37 cubic feet. This shows plainly that Long-leaf Pine in its rate of growth is very sensitive to light conditions. That Long-leaf Pine is a light-needing species may be also shown by the measurements of trees growing under shade and cover of neighboring trees. In the tree records there are such trees noted 70 to 120 years old with a total volume not exceeding 4 to 8 cubic feet.

It is left to the reader to draw his own conclusions as to what would be the profit to the southern states should the Long-leaf Pine be placed under forestry management in that section.

Washington, D. C. *A. K. Mlodziansky.*

A Botanical Journey in Texas.—II.

CONTINUING our journey up the Rio Grande, late in the afternoon we reached Shumla, a railway station about three miles beyond the Pecos River, but much nearer the Rio Grande. Early in the morning of the next day, equipped for a botanical ramble, I visited the Pecos River, a long stream extending from its junction with the Rio Grande through Texas and nearly across New Mexico. In years of rain it is a large stream. The railway bridge across the river at this point is a marvel of engineering science, being the highest bridge in North America. Its extreme length is twenty-one hundred and eighty feet, and it is three hundred and twenty-one feet high. The river here is very narrow, as is the bottom of the cañon through which it flows, and the bridge practically spans the entire valley. The extreme height of the bridge is so great that it appears too light and airy to support even its own weight, much less the weight of the heavily loaded trains that cross it. A narrow winding path leads down the left bank of the cañon to the river, and it is only when the visitor reaches the bottom of the cañon that he realizes the great height and magnitude of the bridge.

The vicinity of Shumla proved a good locality for botanizing. The bluffs adjoining the Pecos are, perhaps, as much as any portion of western Texas, a favorite haunt of the Resurrection Plant, Bird's Nest, or, as Mexicans call it, Siempre vive, the Selaginella lepidophylla of botanists. Individual plants everywhere on the bluffs crowd their neighbors and car-loads of them could now be gathered, and, perhaps, have been gathered here. This species is remarkable for the plan that it has devised to save itself from dying of thirst. Its broad laciniate leaves, which in wet times are completely spread and prostrate, as dry weather comes on coil themselves so tightly that their upper faces remain fresh and green, while their lower faces become faded and dry, giving to the plant the appearance of a rounded dead mass of vegetation, something like a small bird's nest. The plant is not dead, but sleeping, and when the rains come, or when immersed in water, it quickly revives and opens its green surfaces to air and sun. The plant roots deeply in the crevices of rocks, so that it requires the use of a trowel, or several vigorous kicks from a stout shoe, to loosen its hold.

Sotol, Dasylirion Texanum, the great native forage plant of this region, is common on the high mesas and mountain sides. It becomes five to eight or more feet tall, with two or three feet of the upper portion of its stems covered with greenish liliaceous flowers. Domestic animals could hardly subsist here without this provision for their wants by nature. They eat, in the winter, the cabbage-like head which this plant forms in the late summer to protect the growth and inflorescence of the coming year. Agave heteracantha, the Lechuguilla of Mexicans, is common from Devil River to New Mexico. Its thick and radical leaves are serrated with ugly curved spines. There are several species of Agave growing in western Texas and in New Mexico, more species, probably, than have been allowed. They differ principally in the arrangement and color of their flowers and in the size and form of their fruits. There appear to be two species with bright yellow flowers. The genus needs a thorough revision by a master workman, but only after a year or more of careful collection and study of the species as found in Texas, Mexico and New Mexico. The common Century Plant grows naturally in the lower Rio Grande region of Texas, though I have never seen it credited to that state.

The most conspicuous and, perhaps, the most remarkable shrub growing upon the mesas of western Texas is St. Jacob's Staff, Candle Wood, Ocotillo, Fouquieria splendens. It is a tall shrub, more nearly related to Tamarix Gallica than to any other native or naturalized shrub of Texas. It usually branches from the base or near it. The stems are strict and thickly armed from the base to the summit with pairs of strong spines, from whose axils fascicles of thick roundish leaves proceed. The structure of the stems is largely cellular, but the outer portion of them is woody, dense and hard. The bases of the spines appear to arise in the cellular part, leaving the wood full of holes in their decay, apparently upon the plan on which Opuntia frutescens forms its wood. The bright scarlet flowers are borne in long terminal racemes. When in full blooom it is certainly one of the most attractive of Texas shrubs. Though I have seen thousands of individuals of the species, yet none of them were "almost leafless," as we are told that all of them are. Perhaps they may become so later in the season. Mexicans use the stems of this shrub for fence palings. They sometimes grow and make a living fence. The species is common from Devil River to New Mexico.

It may be said in commendation of the plants of this arid region of the country that they appear to have carefully studied the conditions under which they live, and have well

learned the art of self-preservation; and they have not only lived, but also have found time to make their flowers attractive by their beauty, and often fragrance. Selaginella rupestris grows on damp rocks near the river. It is over most of Texas and common in some of its numerous forms. Close by the bridge I found a fine Lucæna. It was already in fruit, with long pods nearly grown. Low species of Dalea are common on the hillsides, and Hoffmannseggias make pleasant company for them. There are more and handsomer species of those genera of the Pea family along this route than I have met before. Later in the day a visit was made to the near-by Rio Grande. The cañon of that river here is deep and narrow—its walls of rocks so rough and precipitous that a descent to the river was impracticable. But the rains had brought nearly all the vegetation into growth that is ever seen here, and rare and peculiar plants invited an examination of their varied attractions. Ferns were abundant on the shaded sides of the great rocks; the species were about equally divided between Cheilanthes and Pellæa. A form of small Oak with sinuate spinose leaves was common in the ravines. The crowning glory of the hills from Nueces River to the Pecos in the early days of June is Leucophyllum Texanum. It is now in full flower, and its great profusion of light purple bloom literally gives to the hills their own hue.

The Pecan-tree is said to grow upon the upper waters of Devil River, which is its most western Texas limit. In order to keep up its popularity the Pecan has developed a new and valuable variety with a very thin shell. It would seem that in this variety Nature had exhausted her powers in nut-making. The variety is known as Paper-shelled Pecan.

Pin Clover, Erodium cicutarum, a forage plant of some renown, is rarely to be seen in Texas. Here it has to shirk for itself, no attention being paid to it as a cultivated plant, so it is very slow in getting a foothold. Xanthium spinosum, a Clotbur, armed with cruel spines, is liable to become a great nuisance throughout the entire central portion of the United States. As yet it is very rare in Texas, but if it is allowed to gain a hold on farms it will have no successful rival unless it be the Russian Thistle, Salsola; and a man or a beast of good sense would prefer to walk through a field of Russian Thistles rather than through a field of spiny Clotburs.

Machæranthera tanascetifolia is not uncommon in the region which we are traversing. It is now a handsome low-growing Aster with Tansy-like leaves and typically purple flowers. A form with white flowers is frequent. One with rose-colored flowers is rarer. Along Big Creek, near Hays City, Kansas, I found a station where Nature herself had massed the three colors into a miniature parterre of great beauty. The species is sometimes seen under cultivation in gardens, and there are few handsomer native composites.

Nothing of value has been added to botanical knowledge or classification by subordinating the genus Machæranthera or the genus Diplopappus to the Aster, a genus already large and unwieldy. The species of either of the degraded genera are less liable to be confounded with species of Aster than are species of Erigeron and of a half dozen other genera which, as well as they, might suffer. A plant already located, without great reason for a change, should be allowed to remain in its place, though it might as well have been placed elsewhere. That which in science is established should not without great cause be changed, and only then upon the verdict of a competent jury after a fair trial of each case upon its merits.

Several species of Wild Flax (Linum) grow in western Texas, and the cultivated plant is becoming established along most of the railways of the state. From its associations with the dawning of our civilizations we all are to see the venerable old species everywhere. The cultivation of Flax and the manufacture of linen from the tough fibres of its bark began in prehistoric times. Linen was doubtless the first plant product used, next to Fig-leaves, for apparel by the human race.

Gaillardia suavis is sometimes to be seen in western Texas, though commoner farther eastward. Here it usually furnishes its flowers with insignificant rays, and wears a very different general habit from the rayless forms of the species as seen in Kansas.

Before leaving Del Rio, apricots, peaches, plums and green corn of roasting size were on sale in that city, all raised on irrigated lands.

La Junta, Colo. *E. N. Plank.*

Plant Notes.

Clematis paniculata.

WE have already published a figure of this plant (vol. iii., p. 621), as well as the reproduction of a photograph showing a plant four years old from seed (vol. v., p. 91), but no apology is needed for the accompanying illustration of a plant on the grounds of Henry S. Hunnewell, Esq., Wellesley, Massachusetts. This beautiful climber was discovered in Japan about 120 years ago by Thunberg, and it is said to have been introduced a hundred years ago into European gardens. It was probably first sent to this country by Thomas Hogg, and was established in the Parsons' nurseries, at Flushing, thirty years ago. It was so rarely seen in cultivation that it was practically unknown until 1889, when mention of it was first made in this journal. Why it was not more rapidly disseminated can hardly be understood, except that sometimes its seed fails to ripen in the autumn, and, in any event, it germinates slowly. When planted in the spring the great proportion of it does not come up until the second year, a habit which it has in common with many other species of this family. It grows rapidly, however, when once started and makes strong plants, so that it remains a matter of surprise that so little was known of it until it was discovered how readily the plant can be grafted on our native Clematis Virginiana, and still better on C. stans. It ought to be said that the root-stock is only needed to sustain the plant in its infancy, for the base of the graft should always be set beneath the soil, where it will soon throw out strong thick roots of its own to supersede the parent root. Time is in this way saved by grafting, although, when well-ripened seed is sown in autumn in a box and wintered in a cold frame, the plants will appear the following spring and will bloom at two-years old.

We have already described this Clematis so often that little needs to be said about it, and, indeed, it has now become so common that almost every one who takes any interest in garden plants is familiar with its character. It is perfectly hardy, although part of it is killed back every winter, and, indeed, it grows more strongly and is better furnished at the base when cut back hard every spring. Shoots starting from the ground when the roots are in deep rich soil will often grow twenty feet in a single season. In this respect the plant resembles Clematis flammula. It differs from C. flammula, however, in having comparatively large leathery leaves and in producing flowers in long axillary panicles. The individual flowers are an inch or more across and carried in such wild luxuriance that the foliage is entirely covered during the first half of the month of September in this latitude. The flowers are followed by heads of fruits which turn to a clear red, each one with a long silvery tail, so that these feathery tufts seem to hover over the leaves, which persist all through autumn, usually as green as they are in midsummer, but sometimes changing to copper-color and afterward to a dull bronze. The flowers have a distinct fragrance, which is likened by some to that of Hawthorn and by others to that of Hyacinth. Altogether, this vigorous, floriferous and long-lived Asiatic climber is one of the very best for porches or screens, while in parks, large grounds and along roadsides it might well be used, like our own Virgin's Bower, to clamber over shrubbery and drape them with its long stems covered with myriads of white star-shaped flowers.

Fig. 8.—Clematis paniculata in a Massachusetts Garden.—See page 74.

Ipomœa Briggsii.—This species has been in full flower for several weeks in one of the conservatories of the Botanical Garden in Washington. As grown there Mr. Oliver describes it as very showy, resembling somewhat the well-known Ipomœa Horsfalliæ. It has a more profuse growth, however, than that species and bears double cymes of flowers in the axils of the leaves. The color of the flower is unlike that of any other known species of Ipomœa. It is described as a rich magenta-crimson, but the color varies in depth in different parts of the corolla and in different flowers. The tube is about two inches in length, and this expands to a diameter of two inches. The Washington plant is growing in a ten-inch pot, and, judging from the number of open flowers and buds, it is wonderfully floriferous, each leaf on the strong shoots having a cluster of flowers springing from its axil. If it will grow and flower outside as satisfactorily as it does inside it will be a valuable addition to our list of summer-flowering vines.

Cultural Department.

Notes on Begonias.

Begonia phyllomaniaca is, perhaps, the most interesting species in the genus. The striking peculiarity of this plant is that it produces from its stems and petioles innumerable viviparous buds or young growths, which make young plants, if taken off and inserted in sand. It is an upright-growing plant, with succulent, hairy, green stems; eight or nine inches is about the length of the leaves and they are of a light green color. In shape they are obliquely cordate, attenuated, slightly laciniated and fringed. The pale rose flowers, which are produced in axillary cymes, rise slightly above the foliage. They measure about one inch across, are not very showy, but make a pleasing contrast at this time with the green foliage. It comes from Brazil and does best here when grown in a cool greenhouse during the summer months, and in the winter it thrives in a temperature ranging from fifty-five to sixty degrees, Fahrenheit.

Begonia Verschaffeltiana is a splendid winter-flowering plant and is now a mass of flowers. It is a large, strong grower and needs rich soil to develop its large cymes of flowers. In a deep, roomy pan we place three or four plants, which make an effective display while in bloom. In early summer they are turned out of the pans, the exhausted soil removed from the roots, and each plant or stem is then planted separately in the garden. By fall they make large healthy plants, and when the nights begin to cool they are lifted and put back into pans again. When replanted in the pans three or four plants about the same size should be selected, so that they will grow together evenly. If the plants get leggy they can be cut right below the thick head of leaves and inserted in sand in the propagating bed, where they make roots in a short time. This Begonia is a hybrid between B. corolinæfolia and B. manicata. It has large succulent stems clad with large ovate acutely lobed leaves, which have long green petioles. The flowers are in large showy cymes and raised well above the foliage on long stout peduncles.

The flowers of Begonia sanguinea are not showy, but it has handsome leaves and makes a good foliage plant when treated properly. It has erect red stems which are slightly woody at the base and are well covered with leaves from four to six inches long and sometimes longer. They are subpeltate, obliquely cordate, succulent, shining bright green above and deep red below. The plant is in bloom now and the red peduncles are nearly a foot long, carrying small white flowers produced in branching cymes. Young shoots are easily rooted in spring, and if they are potted on during the summer as they require it, by early winter they will make handsome plants. They are grown in the greenhouse during the summer as they make better foliage. If they are planted in the garden care should be taken when lifting them in the fall that the leaves are not torn, as this disfigures the plants.

Begonia peltata is a handsome foliage plant, introduced from Brazil in 1815. What makes the plant so distinct and easily recognized is that its stems, leaves and petioles are completely covered with a soft silvery tomentum. It makes a good stove foliage plant and has a very uncommon silvery color. When well grown it has large peltate, ovate acuminate, thick and fleshy leaves nearly a foot long. The small white flowers are produced at this season in cymes on tall erect peduncles. It is not as free-growing as many Begonias, but with careful cultivation it can be grown into a handsome specimen.

Botanic Garden, Harvard University. *R. Cameron.*

Dipladenias.

Each recurring season reminds us of the value of these Brazilian climbing plants for the greenhouse, and there is a possibility of their soon becoming much used for planting outdoors in summer, since there is every reason to believe that they will be as well adapted for this purpose as for indoor use. Full sunshine is indispensable and rain will not injure the blooms, and in a warm position, with light soil, they will be sure to succeed. We have a batch of seedlings from seed saved last year, and as some of the plants have already bloomed we look forward to seeing them all flower during the coming season. Seeds are not often produced in this genus, but I have personal knowledge of three instances where it has been secured and plants raised from it. It is also an easy matter to propagate Dipladenias from cuttings of one or two joints each, made from well-ripened growth. When rooted they must not be potted in material that will become impacted. We use nothing but fern-root fibre to grow them in. With this it is impossible to overwater the plants, and it holds enough moisture in suspension to satisfy their needs. We use manure-water when the plants are in active growth and bloom. Loam in the soil has been the cause of more failures than anything else. It is necessary to grow the plants in full sunshine, even in the hottest summer months, and plenty of water should be used to spray with, as insects are liable to increase rapidly if they once get a foothold. It used to be considered indispensable to keep Dipladenias in a warm house at all seasons, especially when at rest in winter; the temperature of the Rose-house in summer for daytime, and fifty degrees, Fahrenheit, during night in winter, is best suited to them. It is difficult to imagine a prettier sight than a low span-roofed house with the roof covered with Dipladenias. The sprays of bright pink flowers shade off to crimson as they get older, the same sprays blooming continually from May until November. The growth of Dipladenias is not so rampant as is that of most tropical climbers, and is easily kept within reasonable limits. Last summer Roses were grown successfully in the benches underneath, and there are positions in every greenhouse where these plants would do well. We grow D. profusa, D. amabilis and D. Brearleyana, all of which are good, the latter the richest-colored and largest-flowered of all. We cut the plants back at the close of the blooming period each winter, when they go to rest naturally, and keep them drier until they show signs of starting again at about this time. They are then repotted in pots or pans a size larger. At potting time it will be seen that these plants have large tuberous roots, not unlike Dahlia roots in shape, but more woody. These are the reservoirs of vitality and are easily injured, but if handled carefully there need be no check to the plants. Water should be applied with great care until active growth begins in the warm spring months. When the plants are grown in full exposure to the sun in an unshaded house, the pots containing the plants ought to be shaded by a layer of moss or other non-conducting material to prevent injury to the roots from the heat. We also put a layer of moss on the surface of the potting material in hot weather to show the condition as to moisture, and find this beneficial.

South Lancaster, Mass. *E. O. Orpet.*

Notes on Geraniums.

It may safely be said that the common Geranium, hybrids of Pelargonium zonale and other species, is the most popular exotic plant under cultivation. Through all the changes in popular fancy and through all the ridicule heaped upon bedding plants in general, the Geranium almost alone has been spared. Few plants have so many good qualities and are in so many ways fitted for the amateur and the novice. Geraniums are almost entirely free from disease and are very seldom troubled with insect pests. With common garden-soil, sunshine during the middle of the day and the temperature of an ordinary living-room, one can hardly fail to have them bloom all winter long, and, in fact, they are the brightest of window-plants everywhere. The only practicable danger is the tendency to overwater during the earlier winter months. It is safer always to err on the side of too little than too much.

Wherever bedding plants are used they are indispensable, and usually most effective when planted in masses, and scarcely less so when the free-blooming green-leaved varieties are edged with the variegated forms. They rarely com-

bine well with other plants, and are generally seen at their worst when associated with Coleus. I call to mind, however, an effective bed at Kew, where Verbena venusta, one of the erect-growing, purple-flowered species, had been planted among the silver-leaved Geraniums.

The types are scarcely recognizable in the many superb varieties we now see. One of the parents, Pelargonium inquinans, a species of erect habit, zoneless leaves and compact umbels of short, round-petaled, scarlet flowers, is more nearly exemplified in the variety known as General Grant than in any other cultivated variety I know. P. zonale is the other species, and this is characterized by shorter-jointed growth, more diverse habit and less compact umbels of longer-petaled pinkish flowers. It is probable that other species have entered into the parentage of the many florists' varieties, and even so, it is hard to see how so many fine crimson and salmon-colored varieties could have originated.

Geraniums flower freely when given generous treatment, and, however grown, are attractive in appearance. They are not now grown into specimen plants so generally as they used to be. Many years ago it was customary to accord them a year's special treatment, and many old gardeners do this now. During this time they were not allowed to bloom. Plants intended for specimens are grown from cuttings taken in the autumn. During the next year they are tied out, stopped and otherwise trained into the desired form. A good foundation of short, well-ripened growth is made during the summer, and for the winter the plants are rested in a cool house on shelves near the glass. With the lengthening days of spring it would almost be impossible to keep them from blooming if this were desired. The immense quantity of flowers such plants will produce is surprising to people unfamiliar with this treatment. A gorgeous setting of these well-trained specimens is always an attractive feature in the floral display in the tent near Mr. H. H. Hunnewell's residence at Wellesley, Massachusetts, during the early spring months.

Ivy-leaved Geraniums, forms of Pelargonium peltatum, have increased in popularity during recent years, owing mainly to the introduction of some fine double varieties. Generally double Geraniums, especially among the Zonale type, are not considered as handsome as the single varieties, but they are more serviceable for cutting. The double Ivy-leaved varieties rival in beauty the double Zonals. The stems are longer, the flowers larger, more double and more delicately colored, mostly in rose and scarlet shades, and the individual flowers on some recent importations measure fully one inch across. Owing to their prostrate habit, Ivy-leaved varieties are well adapted for hanging baskets, and several of these formed an interesting feature of the display above alluded to. But after the brightness of the Zonal display had departed, and the plants had been removed to undergo another summer's preparatory treatment these Ivy-leaved varieties bloomed on in good condition for nearly the whole summer.

Wellesley, Mass. *T. D. Hatfield.*

Cypripedium insigne.—This popular Lady's-slipper is one of the best Orchids of the present season. Very floriferous, it is seen in a great number of varieties of a more or less bright yellow color, with the dorsal sepal marked with brighter or fainter black or maroon spots, and more or less white on the upper half. The foliage is always bright green and quite attractive. This species is the parent of innumerable hybrids and varieties which all bear a resemblance to the type. Some are rare and costly, but, perhaps, of no higher ornamental value than the species itself, which is now as cheap as a good Begonia or Cyclamen. This Orchid can be grown by anybody in a warm apartment or greenhouse. It thrives well in a mixture of peat and sphagnum-moss in well-drained pots. Occasional watering with liquid-manure is very beneficial. Light sprayings of the foliage in summer and a pure and warm atmosphere are essential to success. In December or January the flowers expand and keep in perfect condition for months.

Newark, N. J. *N. J. R.*

Jatropha hastata.—This is a curious and interesting stove plant. The stem is somewhat pear-shaped, being much more swollen toward the base than the top, and it seldom branches. The leaves are few in number, usually not more than four or five, and arranged alternately round the upper end of the stem; they are hastate, as the specific name implies, and lobed with from three to five lobes. The leaf-stalks are about five inches long, and the blade is rather larger than the palm of the hand. The plant is deciduous and generally loses its leaves in December. On the stem between the leaf-stalks are what appear to be undeveloped leaves, not unlike small forked spines, which become hard with age; these and the upper portion of the stem are covered with a sticky substance, apparently to prevent insects or ants from climbing up the flower-stalks (which rise immediately from the summit of the stem) and stealing the nectar secreted in the flowers. The flower-stalks appear early in the year and are about five inches in length; the inflorescence is corymbose. The flowers are monœcious, the pistillate flowers being borne in the axils of the forked inflorescence. The flowers are all borne on short pedicels of a bright coral color, and these are not only more beautiful than the flowers themselves, but they persist long after the flowers have fallen away. As the plant rarely branches, and the flowers are monœcious, it is somewhat difficult to propagate. Last February I used a camel's-hair brush to bring about artificial fertilization, and I succeeded in getting a pod of seed, which is just ripening. Jatropha hastata is a native of Cuba and belongs to the Euphorbiaceæ. It delights in a warm temperature and a soil composed of half loam and half good fibrous peat, with a little silver sand added, in well-drained pots. During the growing season plenty of moisture is needed, but when the leaves begin to mature, water should gradually be withheld and the plant allowed a season of rest.

Northampton, Mass. *Edward J. Canning.*

Correspondence.

Propagating Hickories.

To the Editor of GARDEN AND FOREST:

Sir,—How shall I go to work to propagate in quantity different varieties of the Hickory—for example, some which bear remarkably large and thin-shelled nuts? I have been told that it is next to impossible to graft them.

Morristown, N. J. *S. A.*

[We have referred this inquiry to Mr. Jackson Dawson, who says that although he has never tried to graft a Hickory out-of-doors, and it is true that these trees are somewhat difficult subjects, nevertheless he does not hesitate to say that with proper stock and precaution they can be as readily propagated under glass as most of the so-called difficult plants. He has experimented with most of the species, and has succeeded with all he has tried. This success with several species and varieties of Hickory has been gained without any special preparation of the stock, and, in fact, most of the time he has gone to the woods and dug up the stock after he had received the scions. Of course, this made the work still more uncertain, and yet in the worst cases he has saved twenty-five or thirty per cent. of the grafts.

"My method," writes Mr. Dawson, "has been to side-graft, using a scion with part of the second year's wood attached, binding it firmly and covering it with damp sphagnum until the union has been made. The best time I have found for the operation under glass has been during February, and the plants have been kept under glass until midsummer and wintered the first year in a cold frame. In all genera I find certain species which may be called free stocks—that is, stocks which take grafts more readily than others. Thus, nearly all the Oaks will graft readily on Quercus Robur; the Birches will graft more easily on Betula alba than on others; so of the Hickories, observation has led me to believe that the best stock is the Bitter Nut, Hicoria minima. This species grows almost twice as rapidly as the common Shag-bark Hickory, and while young the cambium is quite soft. I should advise any one who wishes to propagate Hickories on a large scale to grow stock of this species in boxes not more than four inches deep. In this way all the roots can be saved and there will be no extreme tap-root, and when shaken out of the boxes the plants are easily established in pots and ready for grafting. If taken up in the ordinary way from the woods it requires almost two years to get them well-rooted, and often the stocks die for want of roots after the graft has really taken. If grown in rich soil the stocks will be large enough to use in one or two years. I should then pot them early in the fall, keeping them from heavy frosts and bringing them into the house about the first of January, and as soon as they begin to make roots I should side-graft them close to the collar and plunge them in sphagnum moss, leaving the top bud of the graft out to the air. The graft ought to be well united about the last of March, when the

plants should be taken from the sphagnum and set in the body of the house to finish their growth. After carrying them over the next winter in a cold pit they could be planted out the following spring and the second year they could be set where they are to remain, unless they are transplanted every second year."—Ed.]

Growing Lettuce under Glass.

To the Editor of Garden and Forest:

Sir,—The conditions under which Lettuce has been forced this winter have differed materially from those of the past two seasons, and a succession of almost sunless days, with damp and warm weather, has made it difficult to grow Lettuce heavy enough to count much when it comes to be weighed up for market. Prices have been the same as in recent years. We have been obliged to keep part of the steam lines on the houses and the ventilators raised partially to prevent rotting off, and even with this treatment the bottom leaves decay as soon as the plants get large enough to touch each other, and when ready for cutting the plants do not weigh more than half as much as they should.

We are using both subirrigation and surface watering in growing Lettuce, and while there is some difference in favor of subirrigation, it is not enough to pay for the extra cost of constructing the beds. We have one house, twenty-two by seventy feet, with solid benches, and two and a half inch tile laid eight inches apart crosswise of the benches, and soil about eight inches deep. The tile gives good drainage and ventilation through the bed, but the watering is all done from above. Last year in this house we grew two crops of Lettuce and one crop of Cucumbers, which sold for exactly $400.

Adjoining this house we have another, twenty-two by seventy feet, with solid benches and cemented bottoms. The tile in this house runs lengthwise, and is connected with open troughs at the ends and centre. The soil is about the same depth as in the first house. The beds are watered by subirrigation through the tiles, the water being turned into the troughs at the two ends and centre of the house. We find this method convenient, and in dark cloudy weather it is more effective than surface watering, because the ground can be kept moist without wetting the leaves. But, as already stated, it will not pay for the extra labor and cost of constructing the benches unless there is a more marked difference than has shown thus far.

Lettuce is selling now at fourteen cents a pound in the Cleveland market. It takes two weeks longer to grow the plants to marketable size than it did last year, and then they do not weigh nearly as much. If we sell half as many dollars' worth out of our houses this winter as we did last we shall think we have done fairly well.

Lakewood, O. *F. E. Carr.*

Cypripediums at Langwater Gardens.

To the Editor of Garden and Forest:

Sir,—The collection of Cypripediums in the greenhouses belonging to Mrs. F. L. Ames, of North Easton, Massachusetts, is one of the largest in the United States. Among Orchids, Cypripediums have a beauty all their own; some others are more brilliantly tinted, but are only attractive when in bloom, and even then the stems of some of them, as of many Cattleyas, are awkward, to say the least. The beautifully mottled foliage of the Cypripediums vies in attractiveness with the curiously shaped and oddly marked flowers.

This collection is rich with many hybrid forms which have been raised here. Cypripedium Jack Ames is a cross between C. Lawrenceanum and C. ciliolare. The plant is much larger than either of its parents. The foliage is particularly large and handsomely shaded in light and dark green. The prominent violet markings on the dorsal sepal are characteristic of the seed parent. The warted, or black hairy spotted, petals are characteristic of both, although in the number and distribution of the spots it more closely resembles C. ciliolare. The gem of all is the primrose-yellow C. insigne Sanderæ. Among several so-called yellow varieties this is the only one worthy the name. If there is anything to mar its beauty it is the merest trace of brown on the lower part of the dorsal sepal and a scarcely distinguishable margin of white on the upper edge. The hybrid Juno (C. Faireanum × callosum) resembles in many respects C. callosum. The curiously twisted petals characteristic of C. Faireanum are very prominent.. C. Winnieanum (C. Druryi × villosum) is a handsome kind with a dark brown line along the centre of the dorsal sepal and a wide margin of white. Orion (C. concolor × insigne), as might be expected, is a pretty hybrid with pale yellow flowers spotted with brown. Minnie Ames, a handsome dwarf hybrid between C. concolor and C. niveum, is white, suffused with purplish pink dots. In Alectro the large dorsal sepal is nearly white. The petals are recurving, violet-spotted, on a green ground. Aphrodite is between C. niveum and C. Lawrenceanum. It is distinguished by a white groundwork on the dorsal sepal, with violet lines running through and violet spotting on the other parts of the flower.

Cypripedium Niobe (C. Faireanum × Spicerianum) has the good qualities of both parents. Its foliage is beautiful, and it has the graceful recurving petals of C. Faireanum. C. Sallieri aurem (C. Villosum × insigne) was known as the yellow Cypripedium until the appearance of C. Sanderæ. It is a distinct and beautiful hybrid. It loses none of its beauty by comparison with C. Sanderæ, and would never be discarded on account of it. C. Sallieri aureum is rather orange-green than yellow, with a few dark spots on the dorsal sepal, and is white on the upper part. The rare C. Chamberlainianum is among the most beautiful and attractive of Orchids. It alone is worth going a long way to see. The type is unique. The foliage is very broad, flat and attractively variegated. The large sepal is green, with a lighter-colored margin and dark lines. The petals are long and twisted, screw-like, and deeply colored with a violet and brown metallic-like lustre. The edges of the petals are hairy. The pouch is violet, dotted with purple, with a band of orange about the mouth. The staminode is very large and bronzy green. C. (Selenipedium) Schroderæ is the finest of its type. The whole of the flower is bright reddish pink, prettily spotted with lighter shading on the infolding lobes of the orifice of the pouch. C. Germinyanum (C. villosum × hirsutissumum) is a beautiful flowered hybrid with the purplish pink petals characteristic of C. hirsutissumum, the dorsal sepal bronzy green, with lighter shadings. C. Leeanum giganteum is the best of all the varieties of this type. The dorsal sepal is very large, and, with the exception of a line along the centre, it is white. The petals are orange-green, with lines and markings of reddish bronze. T. D. Hayward is a cross between C. Druryi and C. superbiens. The groundwork of the large sepal is white, with bright violet lines running through it, and a heavier medium line. The pouch is silvery pink, and the petals pink, with a deeper line along the centre. In C. Measuresianum the petals and pouch are both reddish bronze. The dorsal sepal is green, with deeper lines and margined with white. Creon is another beautiful hybrid. The large sepal is almost wholly purple, there being merely a narrow margin of white. C. (Selenipedium) Brysa (reticulatum × sedeni, var. candidulum) is still among the best hybrids of the New World type. The whole of the flower is white, tinted with rose. The infolding lobes of the pouch are spotted. C. Phœderæ (Lindleyanum × sedeni, var. candidulum), another of this type, is deeper in tone than Brysa. It has the vigor of C. Lindleyanum, and is also a very free bloomer. Like all the Selenipedium type, it is seldom out of flower, and there have been as many as seven flowers open at one time on one flower-stem.

Wellesley, Mass. *T. D. Hatfield.*

Meetings of Societies.

The Western New York Horticultural Society.—IV.

Crimson Clover in Horticulture.

Mr. George T. Powell read a paper on this subject in which he said that this crop was attracting attention, largely because it is an annual and grows at a season when the land is otherwise unoccupied. The frequent failure of Red Clover is a discouraging feature of our agriculture. Crimson Clover germinates quickly and develops rapidly. On Mr. Powell's farm leaves had been seen forty-eight hours after the seed was sown. In Delaware and New Jersey hundreds of acres are sowed with the seed after other crops have been harvested, and in one field from which fifteen tons of tomatoes had been gathered seed was sown in September, and in January plants were dug with the roots three feet long. With Mr. Powell a block of Pear-trees where this Clover had been sown gave a much better crop than an adjoining block where there had been none. Sweet Potatoes, followed by a crop of Crimson Clover, and when planted in the same place next year, showed an increase of yield, owing, it is thought, to the plant-food gathered by this plant. As a special protection for an orchard against drought, Rye four feet high was chained and plowed under, and Crimson Clover sown on the field in July made a great growth. It is a good winter covering and mulch; it

brings valuable fertilizers to the surface as well as collects nitrogen; it checks the late growth of trees so that they will ripen their wood, and in all these ways it is a useful crop for orchards. A growth of Crimson Clover six inches high will add nitrogen to the soil which would cost $16.00 in money. A growth thirteen inches high will add $25.00 worth of the same plant-food to an acre. Where this Clover fails the cause is usually poor seed.

IRRIGATION IN FRUIT CULTURE.

Although the artificial application of water has been practiced for some time in our western states, it has not been considered heretofore essential to fruit culture in the east. But Mr. Hale, in an interesting address, argued that an extra water-supply would be necessary in the horticulture of the future in the eastern states. The cultivation of fruits requires careful labor; much capital has been invested in plants and plantations, with facilities for handling, and the grower ought to go a step farther and insure his crop. Mr. Hale had lost half a crop by drought many times. A neighbor of his had invested $800 in a ram and reservoir, seventy feet above his fruit garden, and had applied water at the rate of one inch a week for three weeks, and thereby increased his product in quantity 150 per cent., while it was of much better quality, so that while the abundant berries on the irrigated land brought eleven cents a basket, the smaller crop on the other land was bringing but nine cents. The increased value of his fruit on three acres paid in one year the cost of his plant. Another neighbor ran a stream through open ditches and doubled his product on an average of nine years, although there was only one severe drought during the time. Last year was a dry one in Connecticut, but on the first of August there came three inches of rain at the home farm, with not a drop at the other orchard. The result was that sixty per cent. of the fruit in the home orchard was classed as extra, while only twenty per cent. in the other orchard reached that grade. In the home orchard twenty-eight per cent. only was in the second-best grade, while forty per cent. was in the second grade in the dry orchard, the remainder in both being of two lower grades. This one shower made a gain in the home orchard of from $1,200 to $1,500. Mr. Hale has planned to irrigate his farm by putting in a six-inch pipe from a spring-fed reservoir on high ground and a four-inch pipe farther down. The farm is like most of those in the Connecticut valley, long and narrow, sloping back from the river, and the pipe has been laid along the contours of the highest ground, with a hydrant every two hundred feet. He has not devised completely a scheme for distributing the water, but he is sure this can easily be done, and he thinks there is not one farm in ten where water cannot be secured for irrigation at an expense which would be met by the increased product. A man near Pittsfield, Massachusetts, buys water from the city at ten cents a thousand gallons, and has put in a pipe to distribute it. He has no doubt that it will pay a good dividend on grass crops, and much more on fruit. It is just possible that the fruit may be of lower quality, but that is by no means certain, but certainly it would be larger, more beautiful and more salable. Windmills are too uncertain, because when water is wanted it is wanted badly. Steam power is used on some farms near Boston, and Mr. Hale believes that if eastern men who have put their money in western irrigation plants had invested it at home it would have yielded a rich return.

NEW STRAWBERRY CULTURE.

Mr. L. J. Farmer explained the great change in the methods of growing Strawberries during the last ten years. In fertilizers we are now using large quantities of potash and phosphoric acid and less nitrogen. In transportation we use light cheap crates as gift packages. In the actual cultivation we have made less progress, and there is still too much hand labor. The old way was to set the plants early and cultivate all the season. The new way is to take up the plants at the usual time, trench them in and then transplant to the field about the first of June. The trench is made deep by the plow and the plants are set against the landside, twenty-four to the foot, and left until set out. The rest of the soil is worked deep until planting-time, so that the white grubs are turned up for the birds and the weeds are killed. The plants are sprayed the first season, as can easily be done in this close row, and should be done every week. If planted in ground that has not been affected by old beds they will need no further treatment. He wets the plants before moving them; takes abundant earth with the roots, and they keep right on growing. In transplanting it is not necessary to pinch off the leaves, as the plants are like potted plants, only better. In the field the rows are five feet apart and the plants a foot apart in the row. If confined to one berry, he would plant the Parker Earle.

NUT CULTURE.

There is much encouragement to plant our native nuts and some of the foreign ones. As a rule, our indigenous trees are good bearers, and, in Mr. Van Deman's opinion, they produce nuts of better quality than foreign ones. The Chestnut is receiving the most attention now, and there are a few well-marked native varieties of value. Although they are smaller than the European varieties, they are of better quality and very productive. The best are Delaney, Excelsior, Griffin, Hathaway, Morrell and Otto. Rocky hillsides and other places unsuitable for tillage can be used with profit for nut-trees, and they can be set about buildings and in pastures. The European varieties seem more profitable. It seems to be a rule that the more pubescence the nut has the better its quality. European varieties are more fuzzy than the Japanese, and less so than the American sorts. The most prominent of these are the Paragon, Numbo, Ridgely and Hannum. Japanese Chestnut-trees have a more dwarf habit, and the nut has a bitter skin. They graft quite readily on American seedlings, and the best varieties introduced are Alpha, Early Reliance, Grand and Superb. Among the Hickories the best nut-tree is the Pecan, a native of our southern states, and the Shell-bark Hickory, common throughout the north-eastern states. A firm in Pennsylvania ships more than twenty tons of hickory nuts every year. The nuts should be planted in rough places four feet apart each way and thinned as they grow. Seedlings are variable, and so they must be grafted. The principal varieties are Hale's, a large thin-shelled sort, Leaming, Curtis, Elliott and Mulford. Among the Walnuts, our native Butternuts may, perhaps, be improved, but the so-called English Walnut is the best of the family, although it is difficult to grow as far north as New York. There is no doubt that nut-trees are hard to graft and to bud. Evaporation should be prevented until the sap begins to flow. When the sap starts the grafts should be put in underground. The scions should be cut so as to have the pith all on one side, or, if necessary to graft above the ground, they should be covered well to prevent all evaporation possible.

Recent Publications.

Lessons in Elementary Botany for Secondary Schools. By Thomas H. MacBride, State University of Iowa. Boston: Allyn & Bacon.

With so many excellent elementary text-books on the science of botany, any newcomer is apt to find a crowded field. But the new year has brought a new botany, which is in a measure a new departure. The plant-lover who has learned his plants in the woods, who has been impressed with the wonderful order and beauty of the trees as they spread their naked branches against a wintry sky, and watched the swelling of the Cottonwood-buds in early spring, seen the Box-Elder twig take on an added color as the warm days approach, and admired the orderly arrangement of the scales in the bursting Lilac-buds, has often wondered that no book-maker has adapted a botany to what he sees about him. The boys and girls begin their study of botany usually just after the Christmas holidays, when all the land is bare, while the text-books have usually begun with the germinating seed, or the tiny seedling. Professor MacBride has been impressed with this incongruity and has endeavored to prepare a book adapted to the season when botanical study usually begins. In doing so he wisely places in the hands of pupils twigs of the trees and shrubs growing all about them—and with which many of them never become acquainted. The author has an important secondary object in view, for in his preface he says: "We have before us the spectacle of a great nation absolutely ignorant of the principles of forestry. If the schools can so shape botanical instruction as to make it practical in the direction of a better appreciation of the value of a tree, they may in so doing advance, not the cause of science only, but of humanity." This sentiment will find emphatic approval in the heart of every tree-lover, and it is a pleasure to add that Professor MacBride's book goes far to fill the purpose noted.

It is a modern book and demands a modern teacher. The days when a student could "pass" in botany without ever having handled a plant, gaining his limited knowledge from the text-book, are over. The book under consid-

eration has little of the didactic in its method. The pupil is forced to study the plant, and the book is merely incidental—a part of the apparatus he uses in reaching his determinations. With the whole realm of outdoor nature as a laboratory, twigs, buds, seeds, seedlings, leaves, buds again, flowers and fruit are inspected in turn, and with the passing season the pupil knows something of his plants and has thought little of his book. This is the true method, and a welcome addition to efficient helps in teaching.

Notes.

In regard to the statement that the Idaho Pear is hardy where other varieties fail, Dr. T. H. Hoskins writes that he does not find it sufficiently hardy for north-western Vermont, or, at least, not more hardy than Flemish Beauty or Ondaga. The trees will live until they begin to bear, but producing fruit and resisting cold winters together prove too severe a strain upon them. The only Pears which have succeeded in northern Vermont are the Russian varieties, which are entirely at home and yield abundant fruit.

A correspondent of *The Independent* writes that the original Apple-tree from which the variety known as Grimes' Golden Pippin has been distributed, is still standing two miles from Wellsburg, West Virginia, at the head of a deep ravine. The tree is about a hundred years old, and Mr. Thomas Grimes, who originally brought the fruit to notice, has but recently died. The tree is untrimmed, neglected and shows many signs of age and decay, and there is nothing about it to indicate that it is the parent of trees scattered all over the world, for even in Australia Grimes' Golden is a famous apple.

A spar of Douglas spruce, which has been one of the conspicuous landmarks at Kew, where it has been used for thirty-five years as a flagstaff, has become decayed at the base, so that it was necessary a short time ago to cut off several feet of it. A new piece has been spliced on and strengthened by iron bands, and the staff is once more erected. The spar was presented to the Royal Gardens in 1861 by Edward Stamp, Esq., and was cut in the woods of British Columbia. Its total height is 159 feet, of which twelve feet are sunk in a brick pit. The age of the tree was about 250 years and its total height about 180 feet.

Mr. J. Hale says that a Peach-tree three or four years old should not be allowed to bear more than 250 peaches, one four or five years old not more than 300, and a full-grown tree not more than 500. This means that the peaches should be at least six inches apart. Five hundred peaches make six to eight baskets of fancy fruit. Three thousand peaches to a tree would sell for less money and ruin the tree. Mr. Hale puts step-ladders under the trees and begins to thin when the peaches are about three-quarters of an inch in diameter, and every fruit that is diseased or stung by the curculio is carried away to be burned. The rest of the thinnings are thrown on the ground and left there.

Oranges are in plentiful supply from the Pacific coast and the Mediterranean, and continue to sell at low figures, although there has been an advance of fifty cents a box during the past fortnight. While Florida oranges are extremely scarce and consequently high-priced, $1.00 apiece, as stated by us last week, is evidently an error, that being the rate for a dozen. Grape-fruit, the high price of which we noted last week, has since then continued to advance, and the limited importations, now at the close of the season, are commanding extraordinary sums. A few days since two barrels of small-sized grape-fruit realized the extraordinary price of $20.00 each in this city, and seven barrels were sold in Philadelphia for $22.00 each.

The floral decorations at Delmonico's on Monday evening for the last of the Patriarchs' balls of this winter, while the most elaborate of the season, were characterized by marked simplicity. In the ball-room the rich cream-colored walls, delicately touched with gold, served as an admirable background. Graceful festoons of wild smilax, from Alabama, depended from the cornice. The unconventional treatment of the large mirrors which comprise the sides of the room was in striking contrast with the profusion of Orchids used in previous years. A hidden trellis of wire half-covering the upper part of each mirror in irregular outline was gracefully covered with the smilax and roses, the effect being that of a wild Rose-bush clambering at will. An effort had been made to use Bougainvillea glabra for color instead of Bridesmaid and Madam Cusin roses, but persistent search in New York, Philadelphia and Boston secured only enough for one mirror. La Reine tulips, in heavy garlands, afforded the color-relief between the windows, and the chandeliers and music-balcony were gracefully ornamented with roses and asparagus. This color-effect was continued in the corridor, where the walls were heavily banked with pink azaleas, luxuriant plants of Kentia Belmoreana, their immense drooping leaves contrasting with bushy plants of no less graceful Arecas, and with young trees of native New Jersey Red Cedar. Well-grown plants of Nephrolepis davillioides furcans massed with tulips and other pink flowers formed banks for the mirrors in this sheltered promenade.

A bulletin has just been issued by the Division of Botany of the United States Department of Agriculture on Legislation Against Weeds. Laws against noxious weeds are already on the statute books of twenty-five states, and as these are all quoted a comparison between them is interesting. In most of them the common names alone of the weeds to be suppressed are used, and, therefore, in some cases it is doubtful what species is meant. Again, the laws of Wisconsin and Minnesota proscribe species which do not grow in those states, and by a misuse of technical names Wheat and Oats are proscribed in a late Minnesota law. In the Iowa law against Thistles the common name of the Canada Thistle is followed by the botanical name of another plant, and since the law is evidently meant to apply to one species it may be doubtful which of the two is meant. A table of all the proscribed weeds in the different states is given, and Mr. Lyster H. Dewey, who has prepared the bulletin, observes that although the Canada Thistle is proscribed in almost all the states, it is not as generally troublesome as this would indicate. In two of the states Sweet Clover is proscribed, a plant which is rarely harmful as a weed, and in certain places it has been found valuable as a renovator of the soil and as a forage-plant. In the southern states, where the Nut Sedge, the Giant Ragweed and the Wild Onion are most serious pests, there are no laws whatever against weeds, while Arizona is the only state of the Rocky Mountain region and in the Great Basin which has passed such a law, although this region is inhabited by many native weeds which are particularly aggressive, and many introduced weeds thrive with great vigor in irrigated fields. The most interesting part of the bulletin is the chapter on the essential provisions of a general state weed law, which we commend to the legislatures of the various states, most of which are now in session.

On the 5th of February, Mr. Frank H. Nutter read a paper at Taylor's Falls, Minnesota, in which, after discussing in a general way public parks and reservations, with their history and treatment, he gave a preliminary report on the proposed interstate park at the Dalles of the St. Croix, where something like four hundred acres of land, partly in Minnesota and partly in Wisconsin, have been acquired as a public reservation. The Falls proper are not high, but the Dalles, with their lofty and precipitous rocks on either side, stained with brilliant colors from oxides of copper, or painted with Lichens and Moss, make a most interesting passage of natural scenery. Mr. Nutter says it would be difficult to find a more attractive combination than the cheerful sparkle of the upper rapids with its tributary brooks, the gloomy grandeur of the Dalles themselves, the quiet beauty of the lake, the sunny intervale dotted with park-like shade-trees, the lofty hills on the Wisconsin side and the gorges across the river, the picturesque cliffs, the plateau on the western bluffs, with its stretch of virgin forest and a westward prospect over rolling farm-lands. Mr. Nutter has made a hasty survey of the place, and, therefore, does not propose anything like a complete plan, but he feels it necessary to state that any comprehensive improvement on this reservation should be based upon a design prepared after a thorough study of the subject as a whole and in detail, so that whatever is done should be done with an eye to what the park shall be as a unit when it is completed. It is a pity that an elementary statement like this needs to be made to an intelligent American audience, but we very much fear that the people of the east, as well as those of the west, will need to be reminded of such truths over and over again before landscape-gardening assumes its true rank among the arts of design. Of course, Mr. Nutter is right when he says that the future possibilities of such a park, if it is enlarged according to his suggestion, should not be developed by the addition of exotic shrubs and the obtrusion of much artificial adornment, but rather by fostering, protecting and emphasizing its natural features, for a true artist in landscape is the one who strives primarily to develop the poetic charm of the place and preserve its spirit in the line of the sentiment which it naturally inspires.